NE Drought Conditions CARC Update: December 2011

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National Drought Mitigation Center
University of Nebraska-Lincoln

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School of Natural Resources
University of Nebraska-Lincoln

University of Nebraska Lincoln

National Drought Mitigation Center

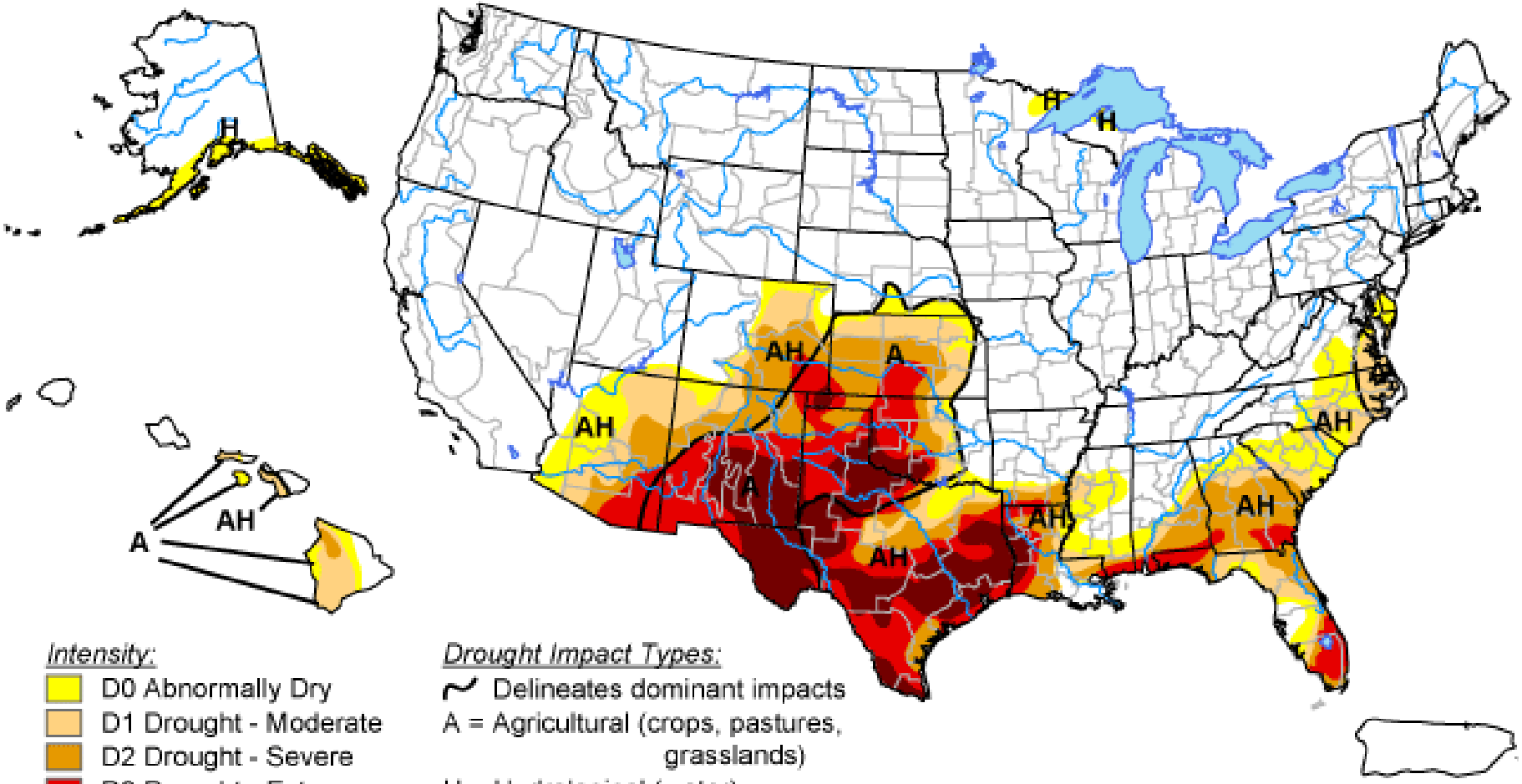
Current Conditions around Nebraska and the region…

University of Nebraska Lincoln

National Drought Mitigation Center

U.S. Drought Monitor

May 17, 2011
Valid 8 a.m. EDT



Intensity:
- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Drought Impact Types:
- Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

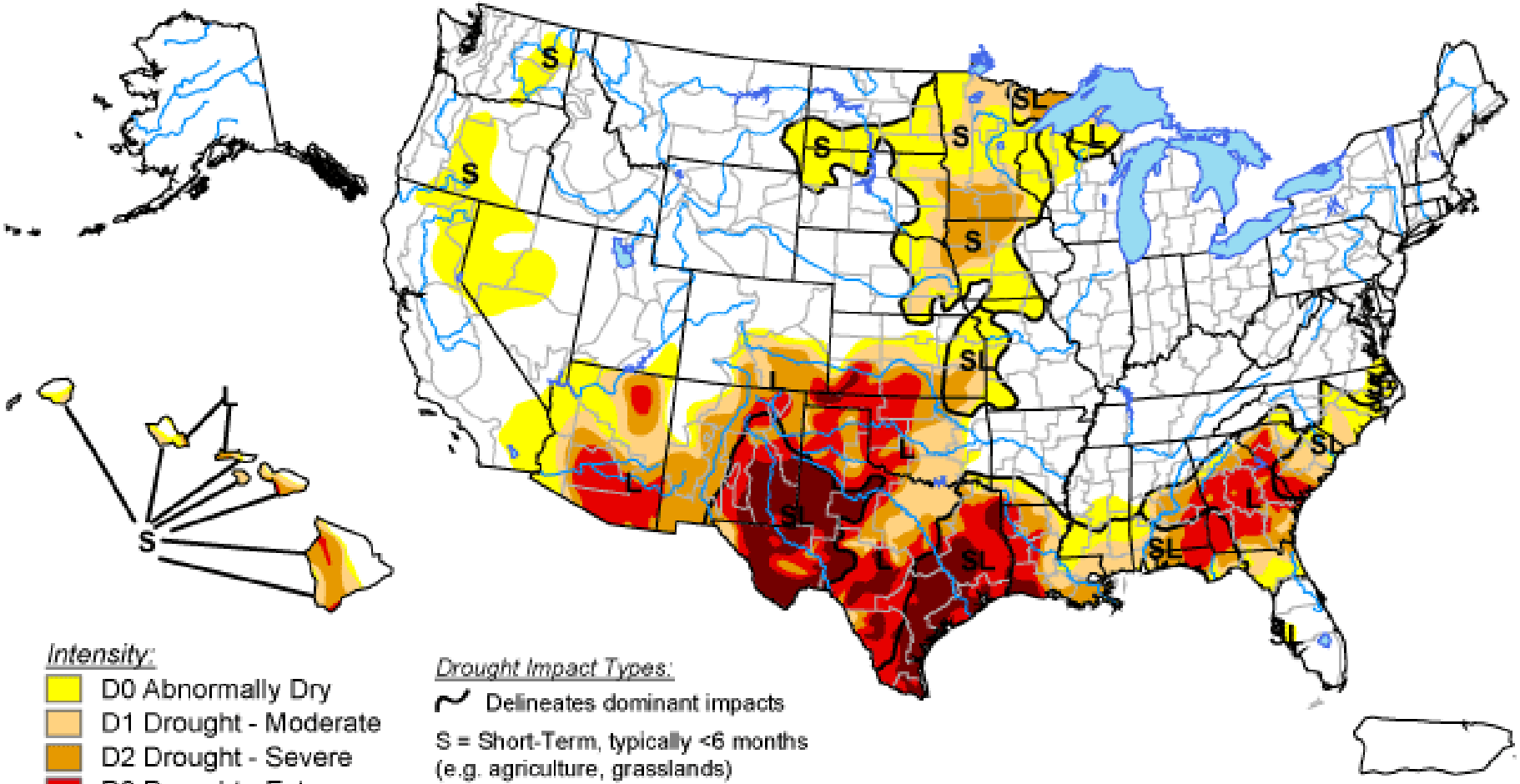
http://drought.unl.edu/dm

Released Thursday, May 19, 2011

Author: David Miskus, NOAA/NWS/NCEP/CPC

U.S. Drought Monitor

December 13, 2011
Valid 7 a.m. EST



Intensity:
- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Drought Impact Types:

Delineates dominant impacts

S = Short-Term, typically <6 months (e.g. agriculture, grasslands)

L = Long-Term, typically >6 months (e.g. hydrology, ecology)

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http://droughtmonitor.unl.edu/

Released Thursday, December 15, 2011

Author: Matthew Rosencrans, NOAA/NWS/NCEP/CPC

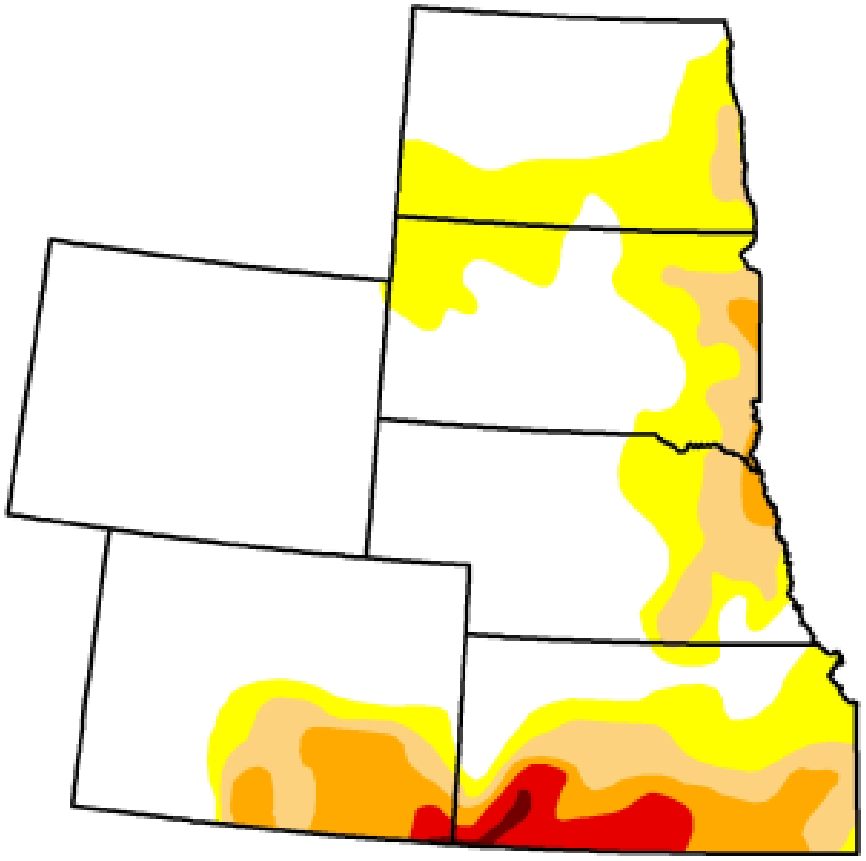
U.S. Drought Monitor

December 13, 2011
Valid 7 a.m. EST

High Plains

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	63.68	36.32	17.90	8.62	2.59	0.27
Last Week (12/06/2011 map)	63.46	36.54	18.05	9.11	2.59	0.27
3 Months Ago (09/13/2011 map)	64.67	35.33	16.76	12.75	6.98	2.96
Start of Calendar Year (12/28/2010 map)	60.35	39.65	19.57	2.63	0.00	0.00
Start of Water Year (09/27/2011 map)	70.09	29.91	17.44	11.97	6.22	2.96
One Year Ago (12/07/2010 map)	66.61	33.39	13.59	2.04	0.00	0.00



Intensity:

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Released Thursday, December 15, 2011

Matthew Rosencrans, NOAA/NWS/NCEP/Climate Prediction Center

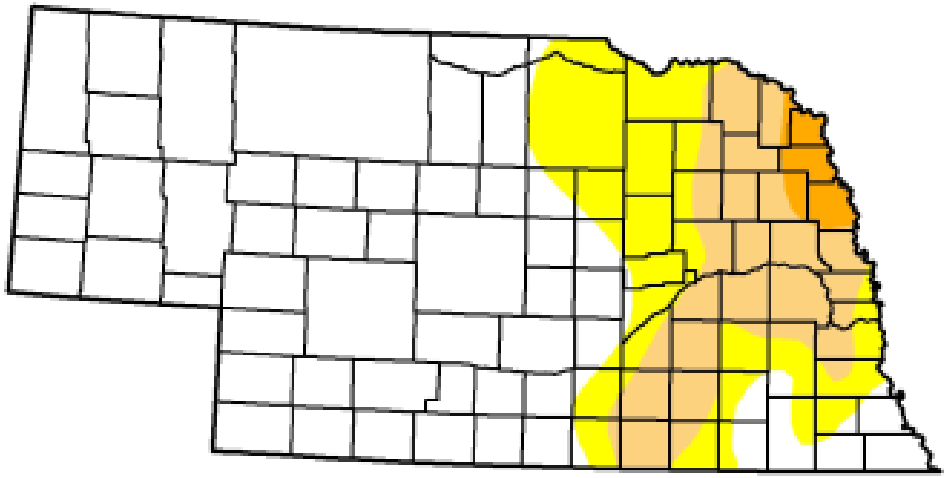
U.S. Drought Monitor

December 13, 2011
Valid 7 a.m. EST

Nebraska

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	68.47	31.53	15.50	1.91	0.00	0.00
Last Week (12/06/2011 map)	68.47	31.53	15.50	1.91	0.00	0.00
3 Months Ago (09/13/2011 map)	59.90	40.10	0.00	0.00	0.00	0.00
Start of Calendar Year (12/28/2010 map)	54.09	45.91	9.96	0.00	0.00	0.00
Start of Water Year (09/27/2011 map)	75.70	24.30	0.00	0.00	0.00	0.00
One Year Ago (12/07/2010 map)	63.40	36.60	9.95	0.00	0.00	0.00



Intensity:

- D0 Abnormally Dry
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Released Thursday, December 15, 2011
Matthew Rosencrans, NOAA/NWS/NCEP/Climate Prediction Center

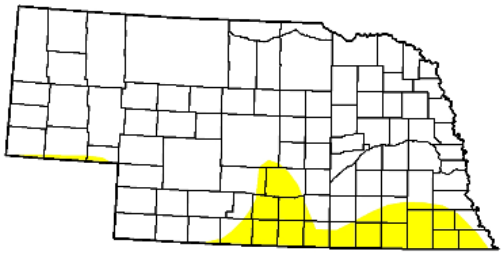
Drought Monitor Archives

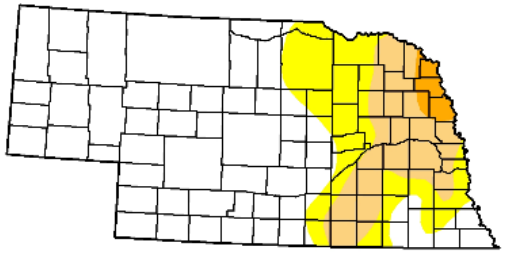
Maps | Tables | Animations | 1999 Archive | GIS Data

Nebraska

Drought Severity

- D0 - Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional



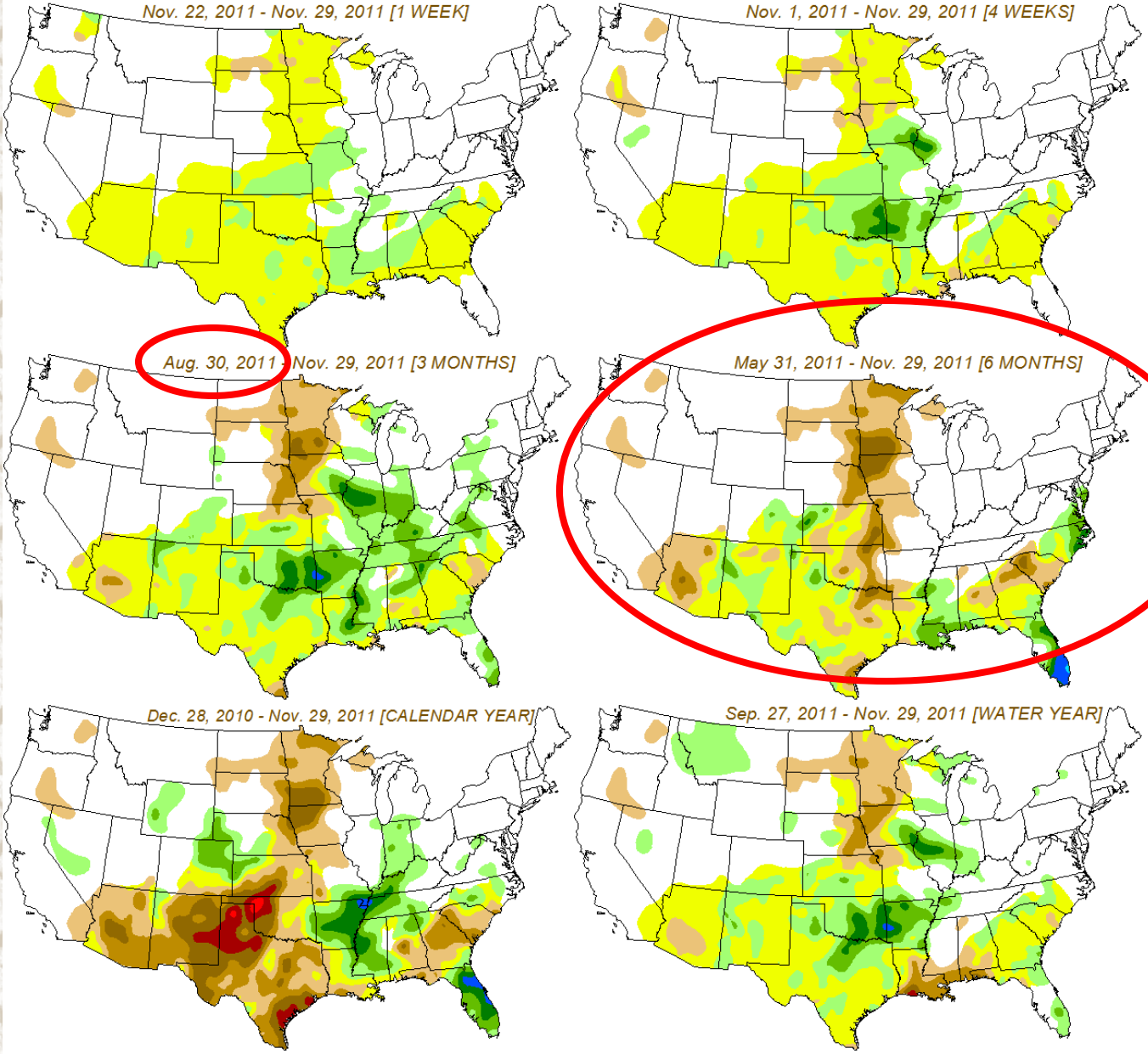


May 17, 2011

December 13, 2011

Week	Nothing	D0-D4	D1-D4	D2-D4	D3-D4	D4
May 17, 2011	87.93	12.07	0.00	0.00	0.00	0.00
December 13, 2011	68.47	31.53	15.50	1.91	0.00	0.00

Drought Monitor Classification Changes for Selected Time Periods



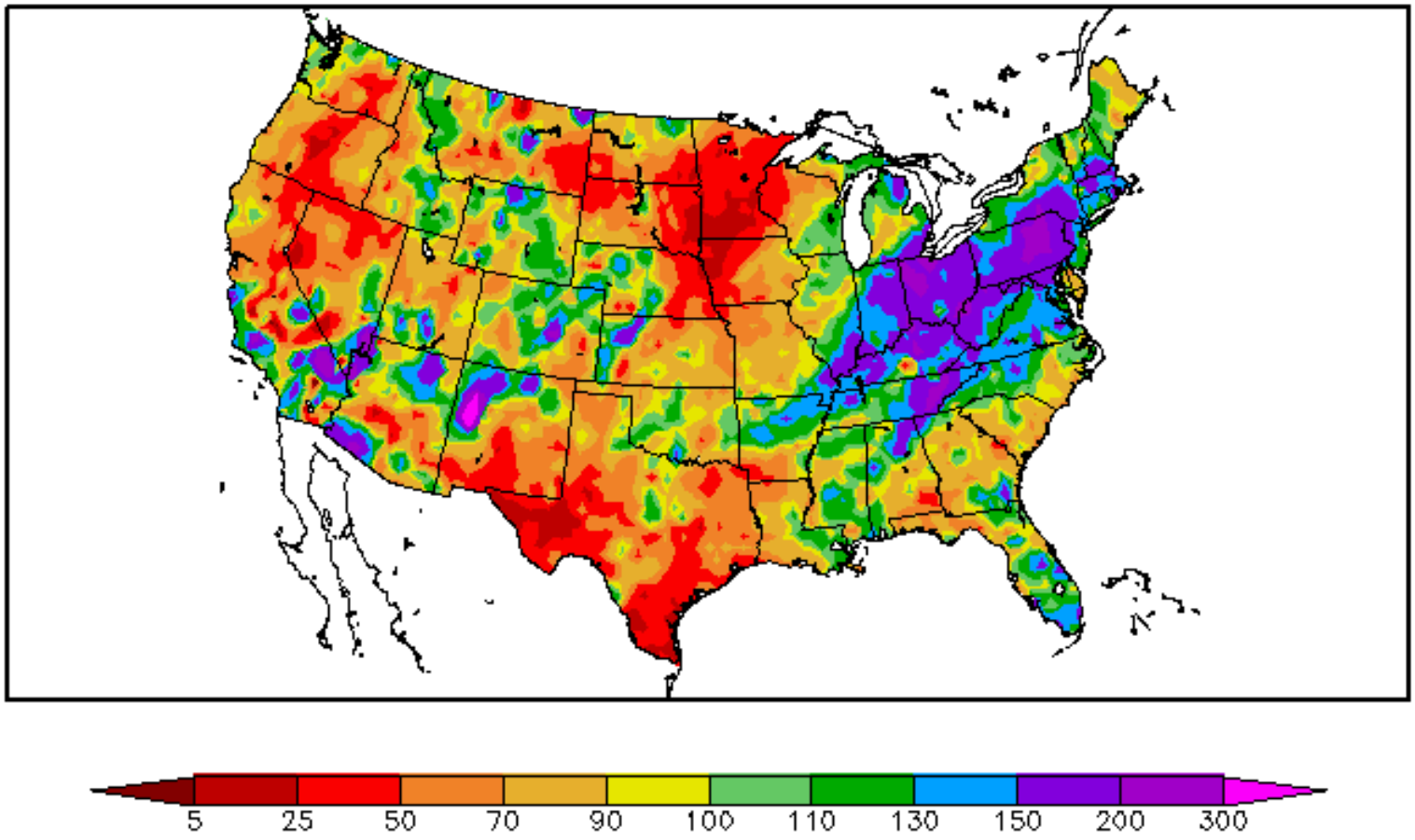
5 class improvement
4 class improvement
3 class improvement
2 class improvement
1 class improvement
unchanged

1 class deterioration
2 class deterioration
3 class deterioration
4 class deterioration
5 class deterioration

These maps depict approximate changes in drought intensity from selected initial times to the current week, with no consideration given to intervening weeks. The change calculations are based on interpolated 4 km grids of the Drought Monitor depiction, and as a result, will be smoother than if based on the published version.

National Drought Mitigation Center

Percent of Normal Precipitation (%)
9/1/2011 – 11/30/2011



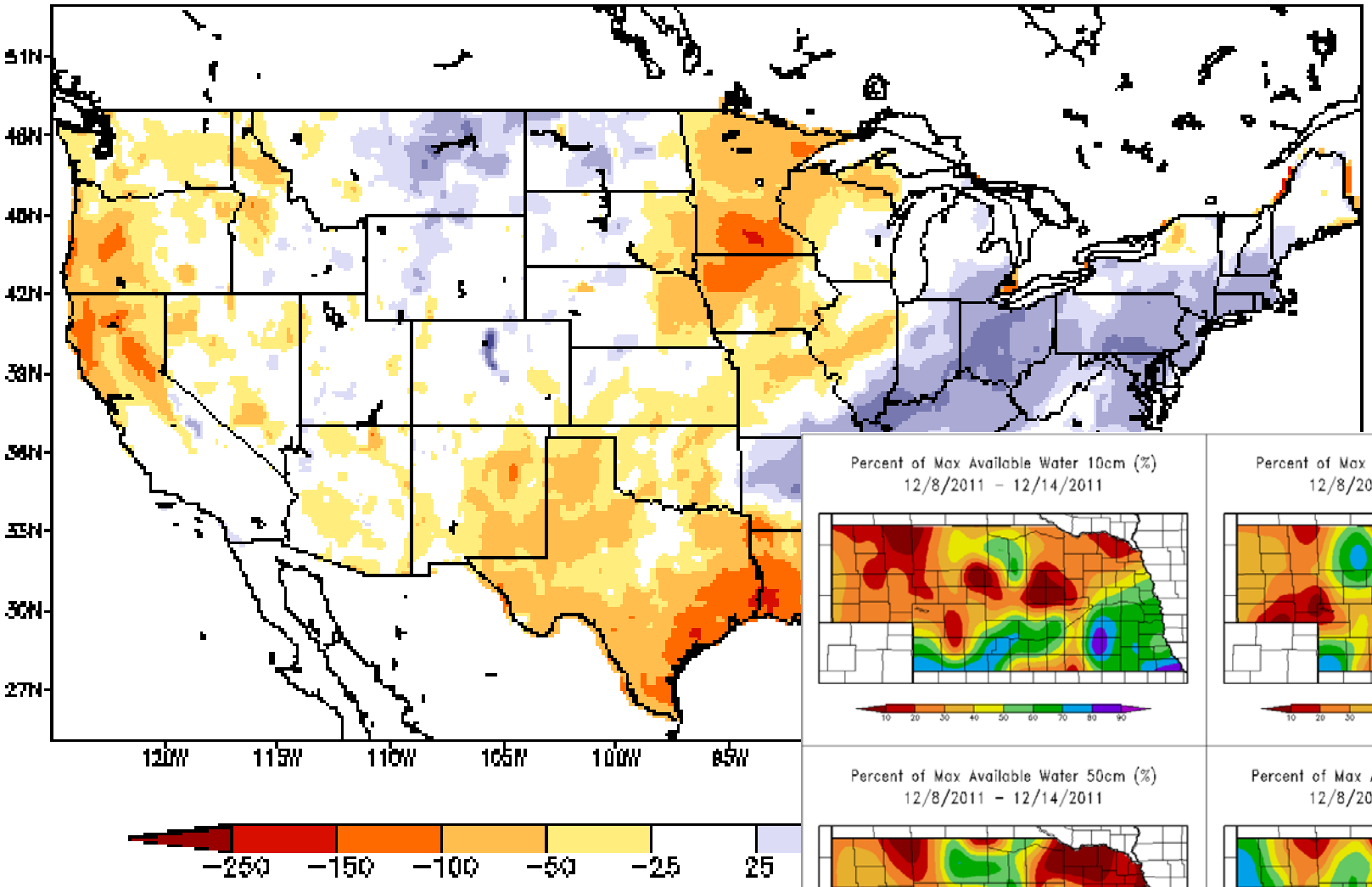
Generated 12/11/2011 at HPRCC using provisional data.

Regional Climate Centers

University of Nebraska Lincoln

National Drought Mitigation Center

Ensemble–Mean – Current Total Column Soil Moisture Anomaly (mm)
NCEP NLDAS Products___ Valid: DEC 09, 2011



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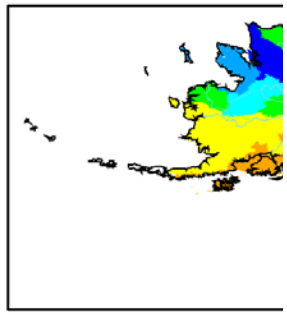
Mountain Snowpack as of May 1, 2011



Percent
1971 to 2000 Average

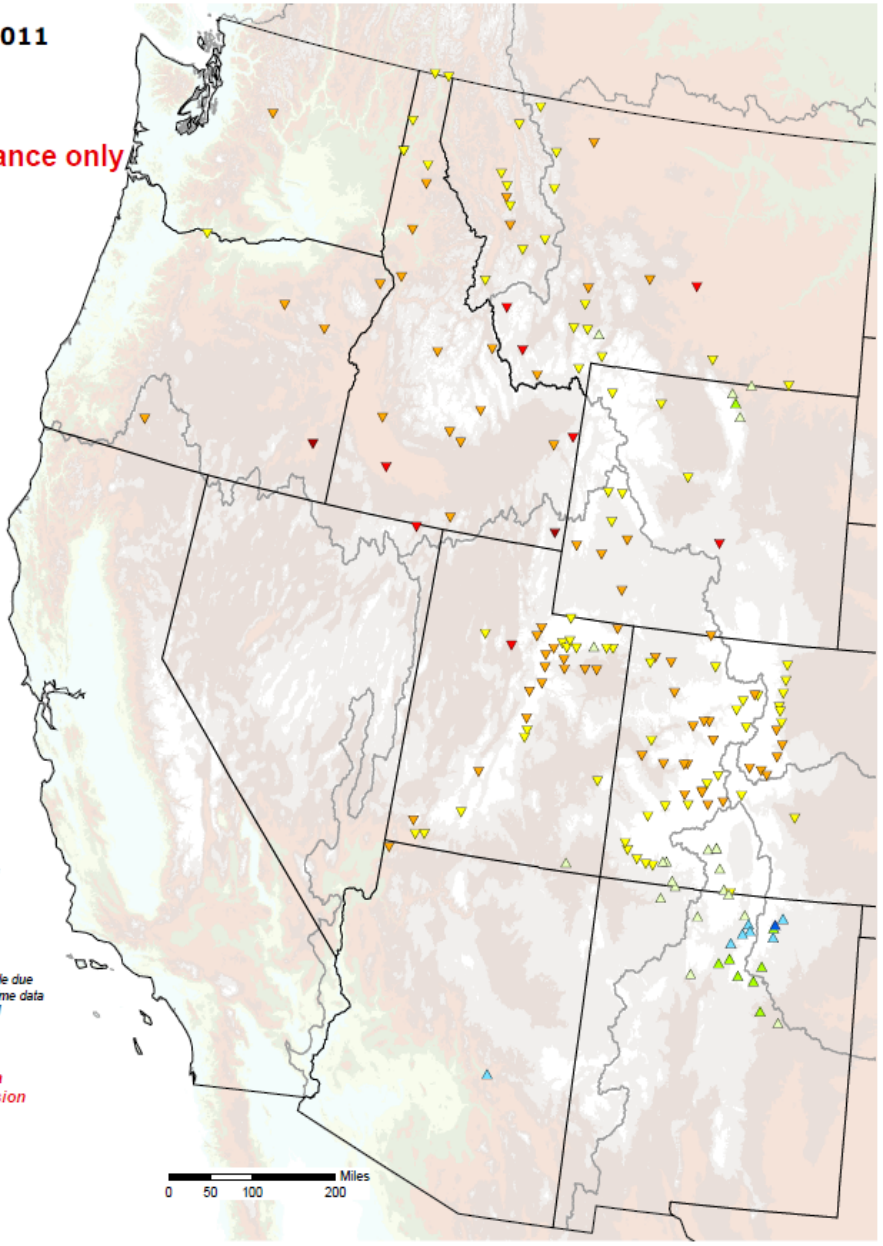
- > 180
- 150 - 180
- 130 - 149
- 110 - 129
- 90 - 109
- 70 - 89
- 50 - 69
- 25 - 49
- < 25
- "0" SWE Measured
- No Survey

Prepared by
USDA, Natural Resources Conservation Service
National Water and Climate Center
Portland, Oregon
http://www.wcc.nrcs.usda.gov

Current Guidance Forecast as Percent of 1971-2000 Normal

Dec 15, 2011

For guidance only



Current Guidance Forecast (% normal)

- >200%
- 159-200%
- 140-159%
- 120-139%
- 100-119%
- 80-100%
- 60-79%
- 40-59%
- 20-39%
- <20%
- Unavailable*

* *Forecast unavailable due to insufficient realtime data or low forecast skill*

Provisional Data Subject to Revision

Miles
0 50 100 200

USDA NRCS

Prepared by the USDA/NRCS National Water and Climate Center
Portland, Oregon http://www.wcc.nrcs.usda.gov/wsf/daily_forecasts.html
Based on data from
ftp.wcc.nrcs.usda.gov/data/water/wcs/daily_forecast/SummaryOutput.csv
Science contact: Jim.Marron@por.usda.gov 503 414 3047

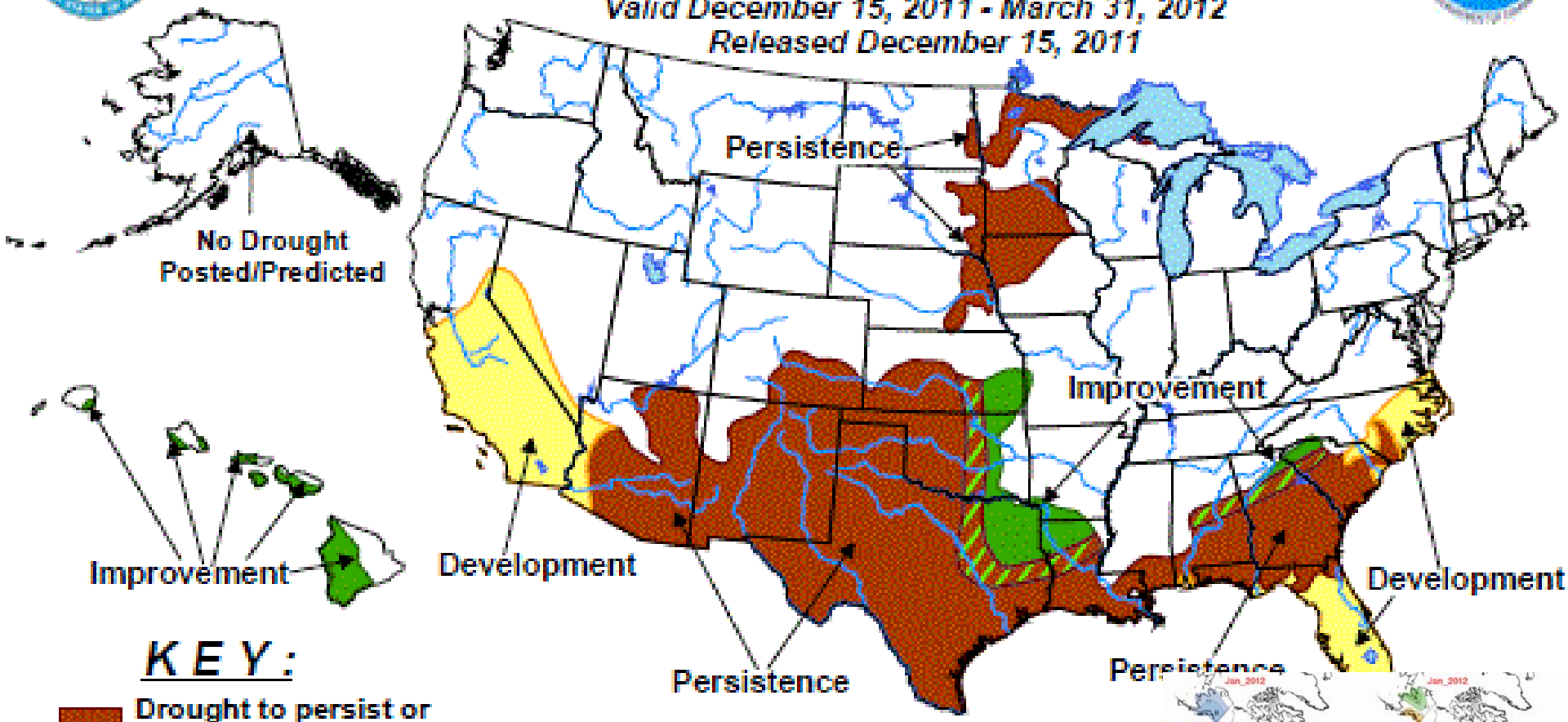
This is a completely automated objective product based on SNOTEL data. This product is not meant to replace or supersede the official forecasts produced in coordination with the National Weather Service.

U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid December 15, 2011 - March 31, 2012

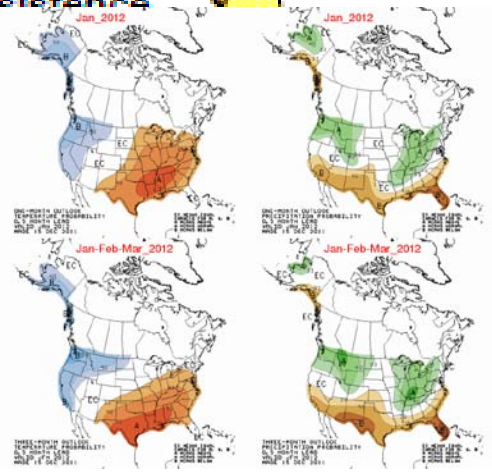
Released December 15, 2011



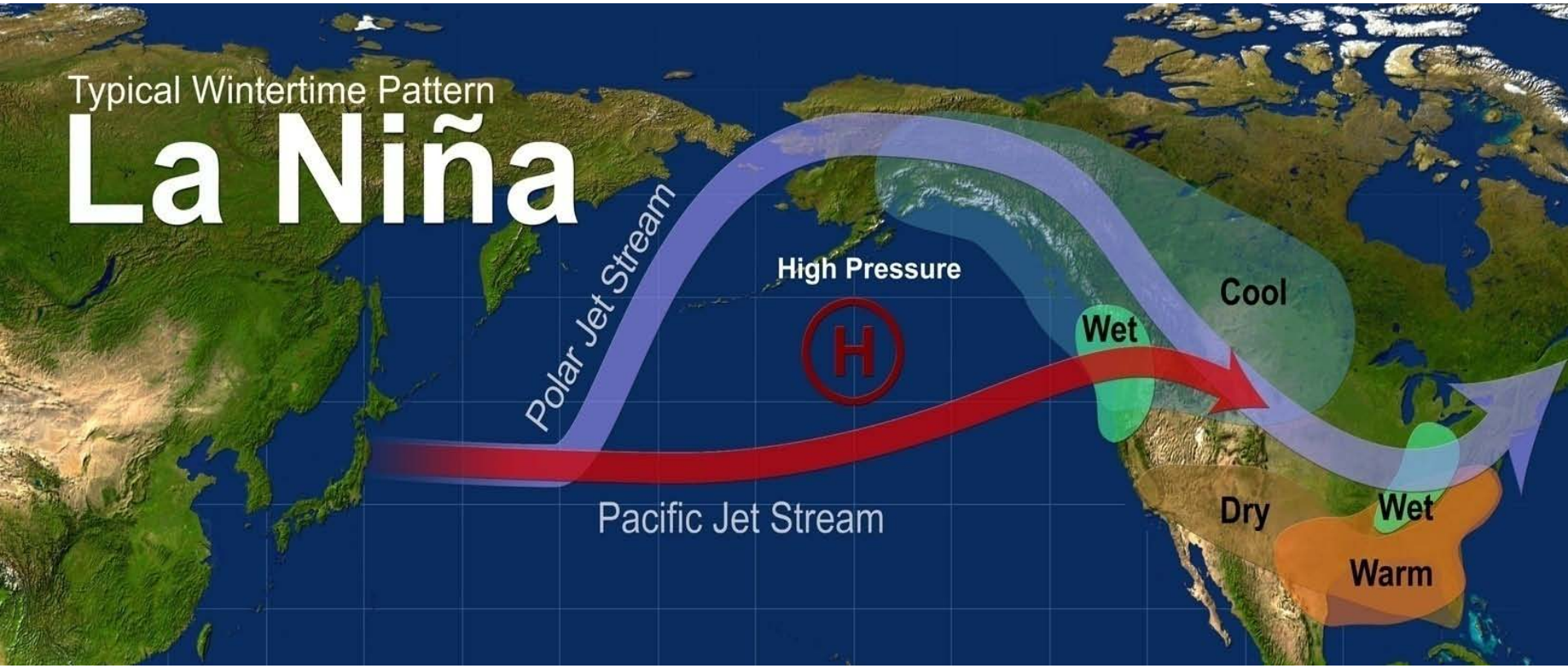
KEY:

- Drought to persist or intensify
- Drought ongoing, some improvement
- Drought likely to improve, impacts ease
- Drought development likely

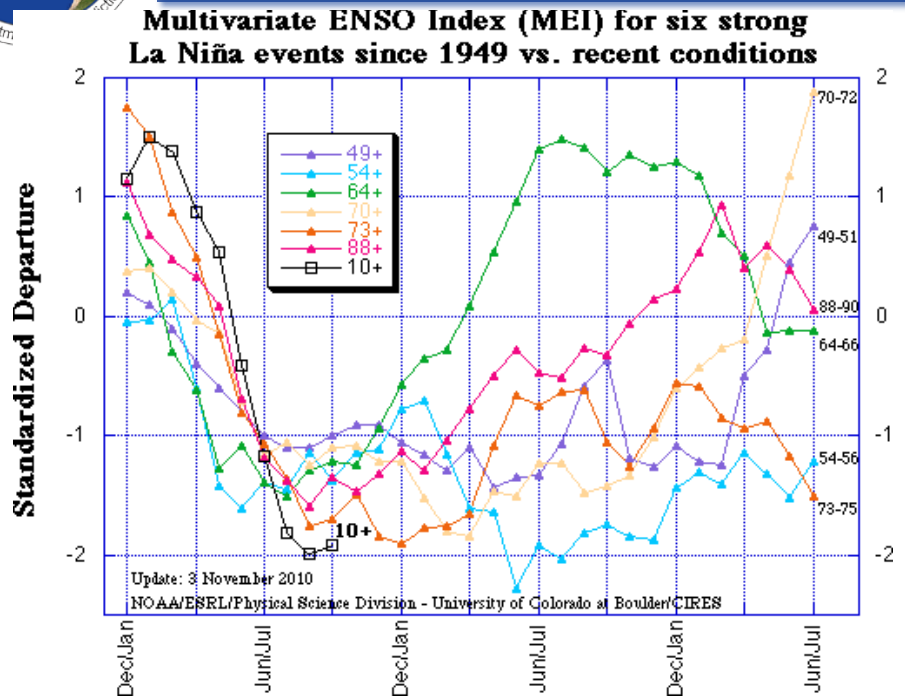
Depicts large-scale trends based on subjectively derived pro
by short- and long-range statistical and dynamical forecasts.
-- such as individual storms -- cannot be accurately forecast
Use caution for applications -- such as crops -- that can be a
"Ongoing" drought areas are approximated from the Drough
For weekly drought updates, see the latest U.S. Drought Mo
areas imply at least a 1-category improvement in the Drough
but do not necessarily imply drought elimination.



Typical US Temperature, Precipitation and Jet Stream Patterns during La Niña Winters

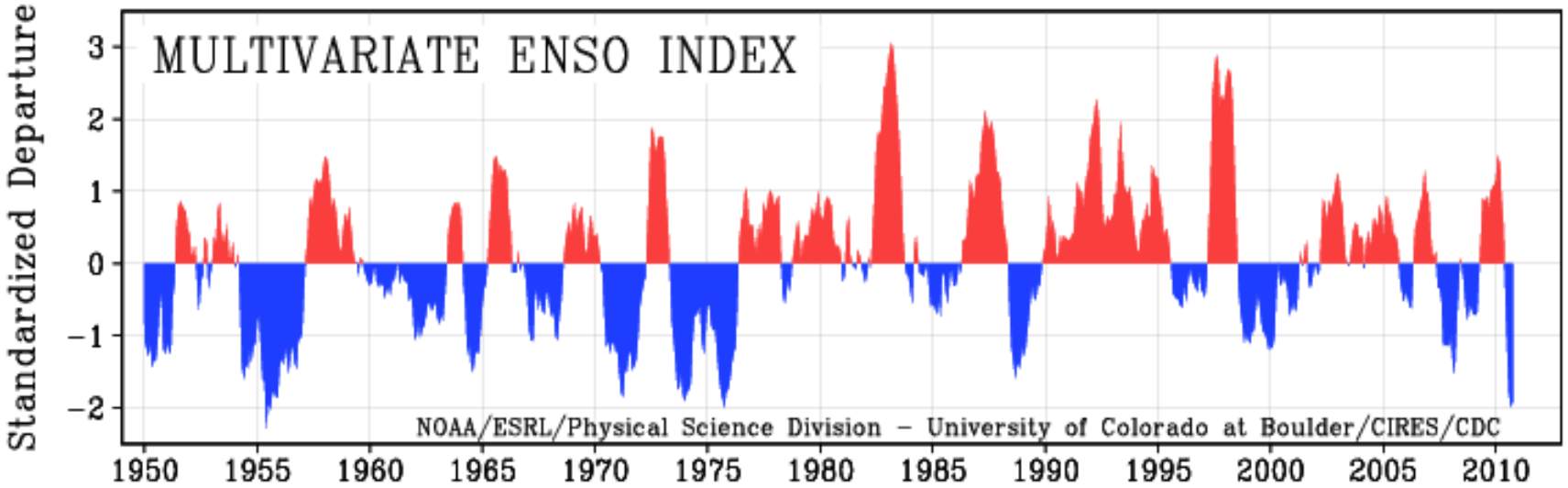


Multivariate ENSO Index (MEI)

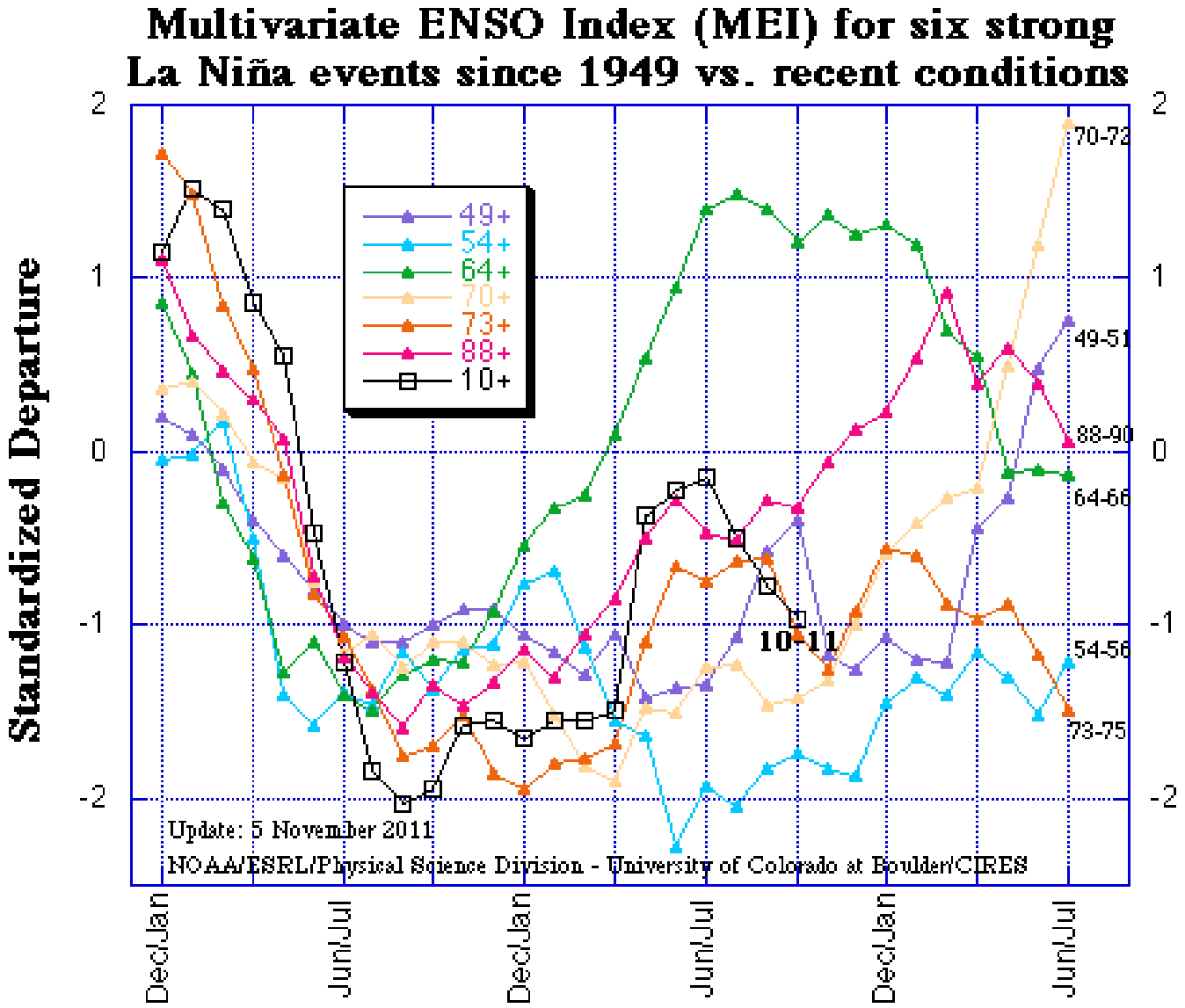


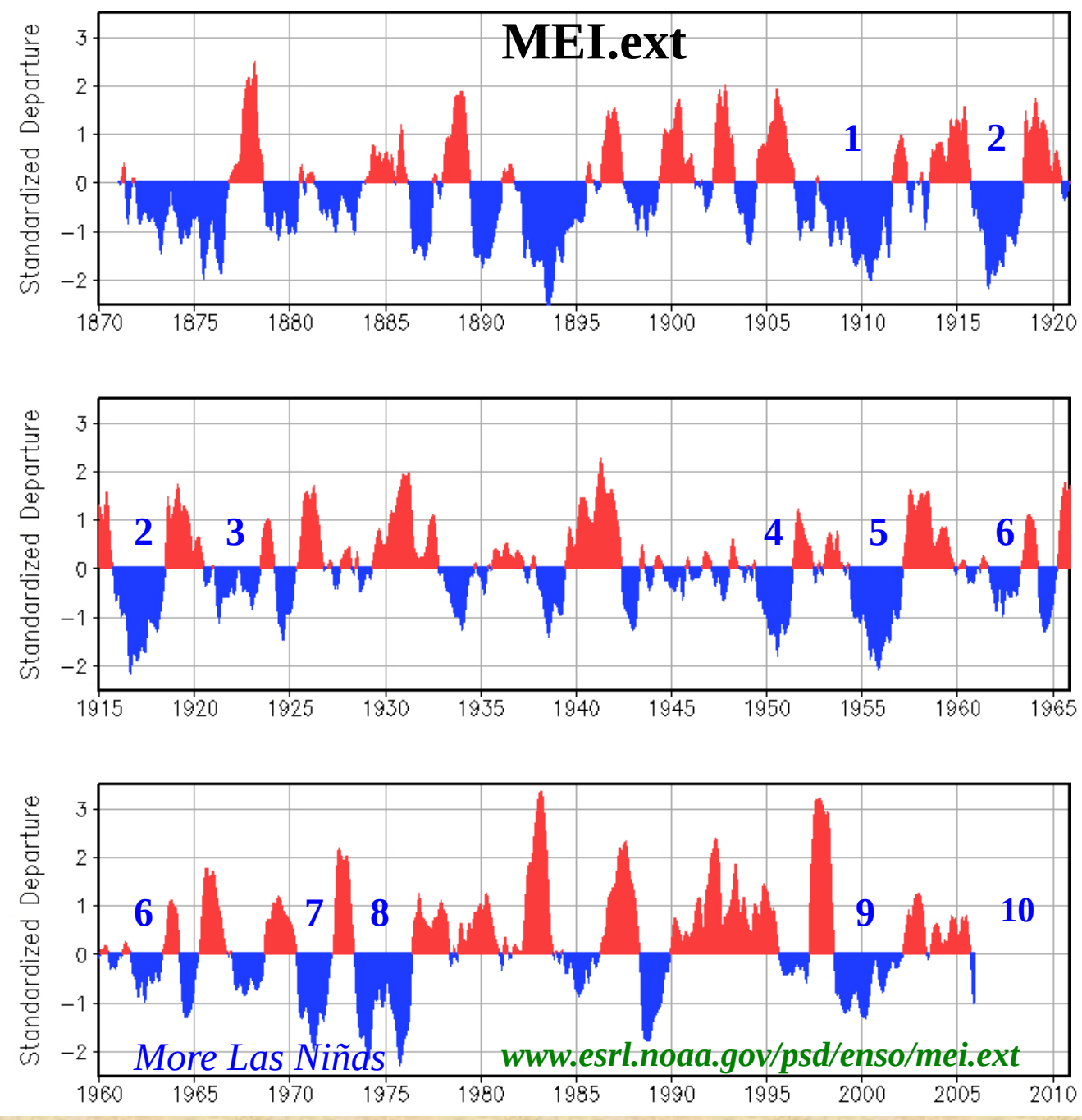
Based on several variables:

- SST's
- Surface pressure
- Winds
- Air temperature
- Cloudiness



Multivariate ENSO Index: recent and six strong La Niña events

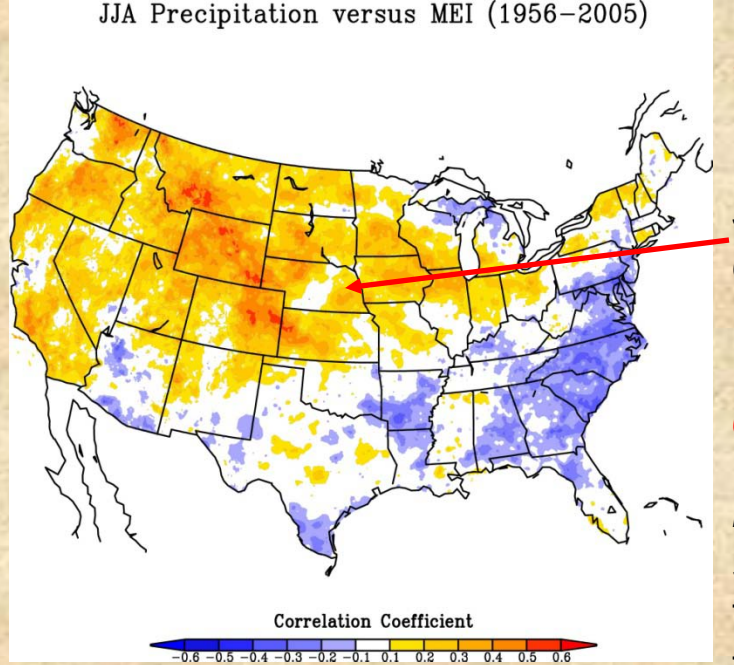


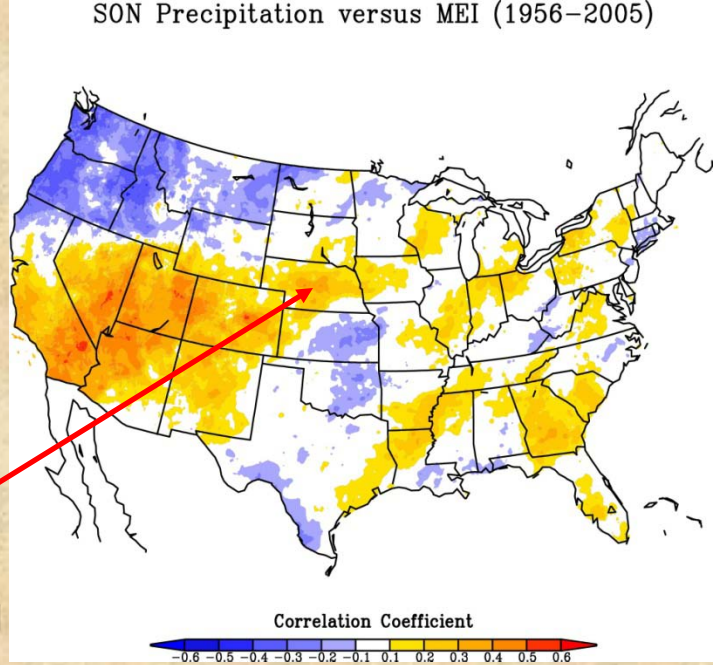


Odds are about 2:1 for large Las Niñas to double-dip (2-year event), both pre-1950 and since then…

There were *10* 'Double-dip' (+ **4** ***'triple-delights'***): Las Niñas in last century: **1908-11**, 16-18, *21-23*, 49-51, **54-57**, *61-63*, 70-72, **73-76**, ***1998-2001***, *2007-09*

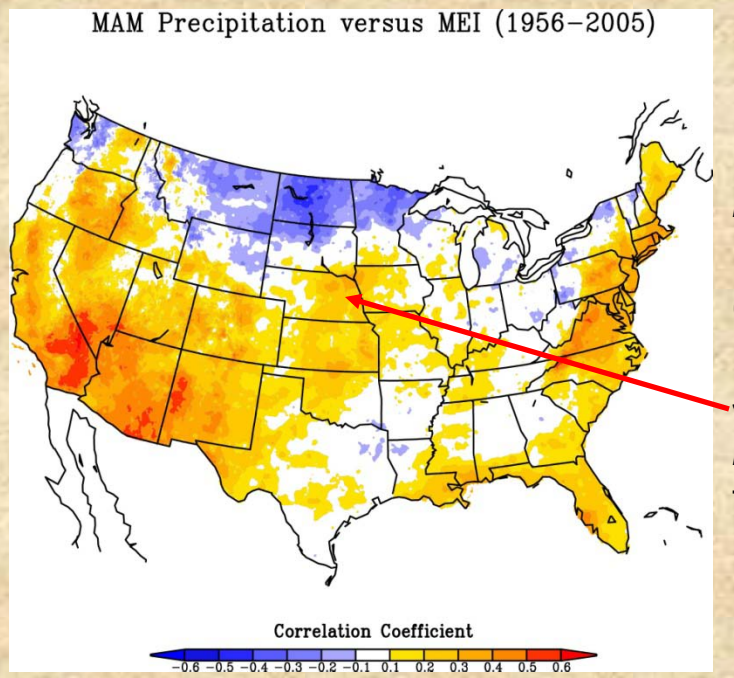
Seasonal cycle of ENSO impacts

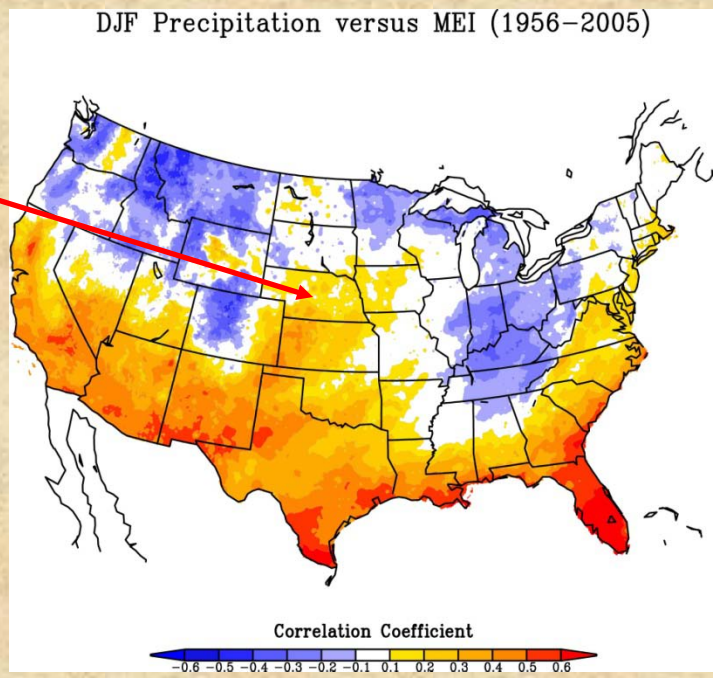




Summer (left) most of NE correlates positively with MEI/ENSO (***dry during La Niña***);

Fall (top right): NE still shows a sign of this correlation, being typically ***dry*** during La Niña';

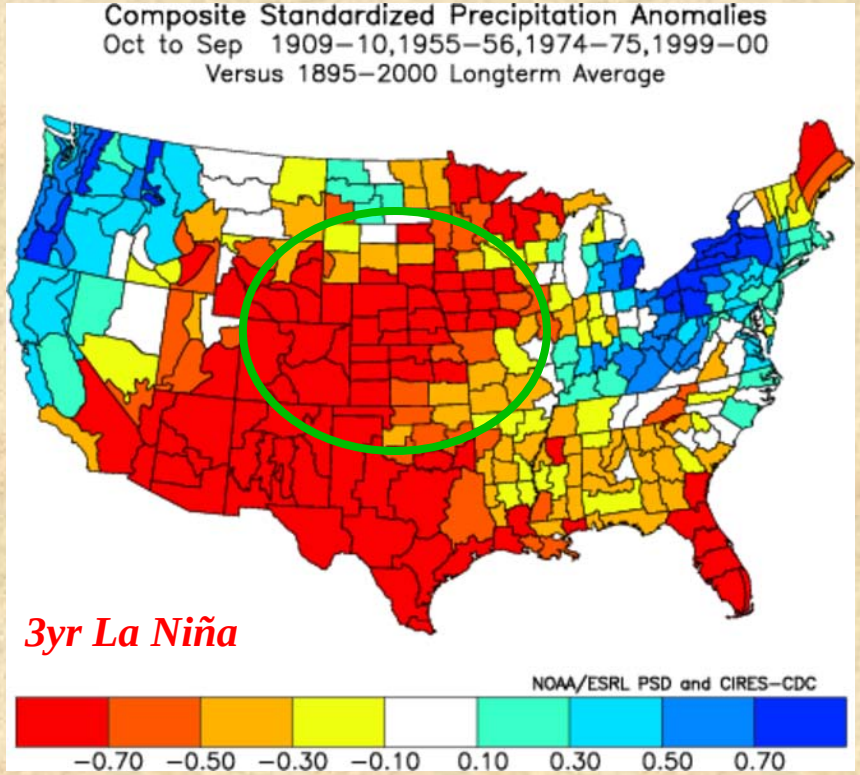




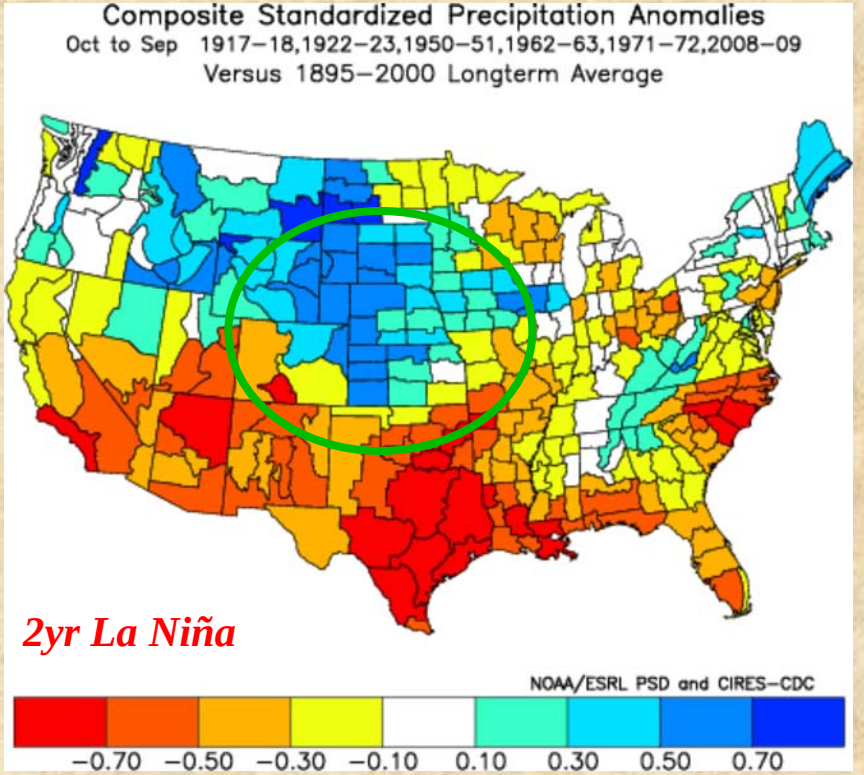
Winter (bottom right): NE still has a positive (**dry**) correlation with MEI;

Spring (bottom left): NE continues trend towards ***dry*** La Niña conditions.

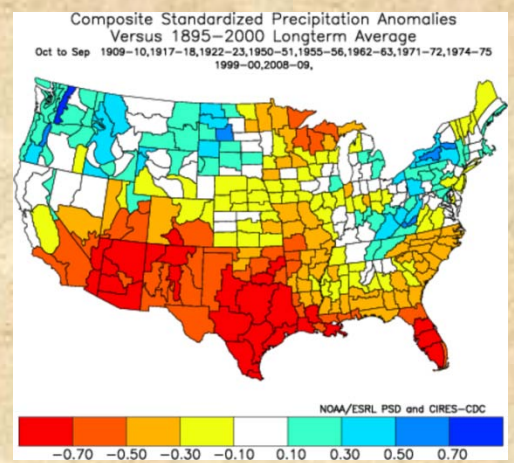
2nd year La Niña composites for October-September



3yr La Niña



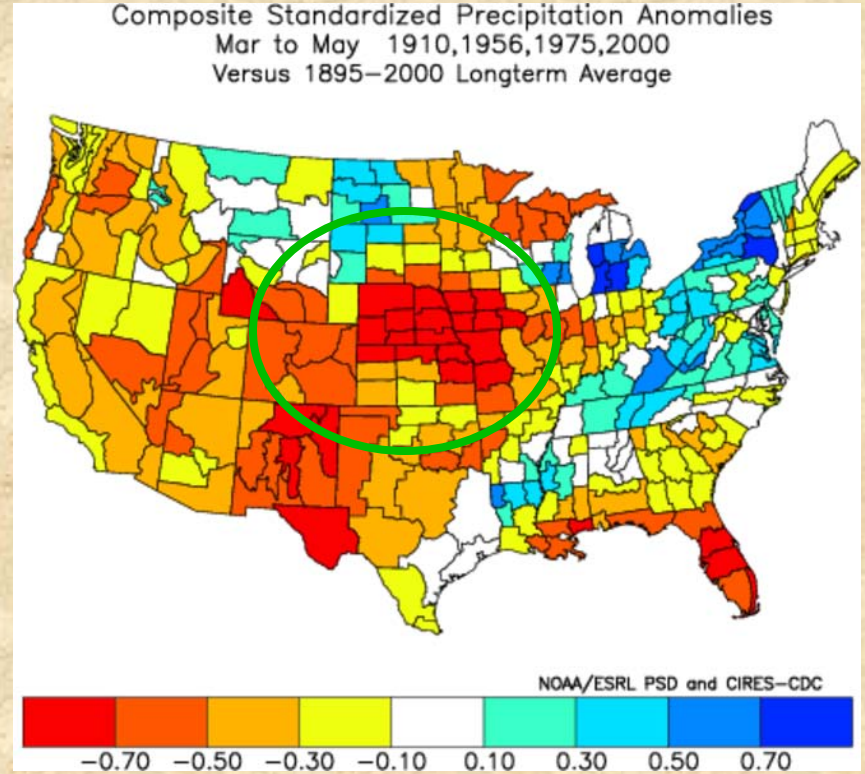
2yr La Niña

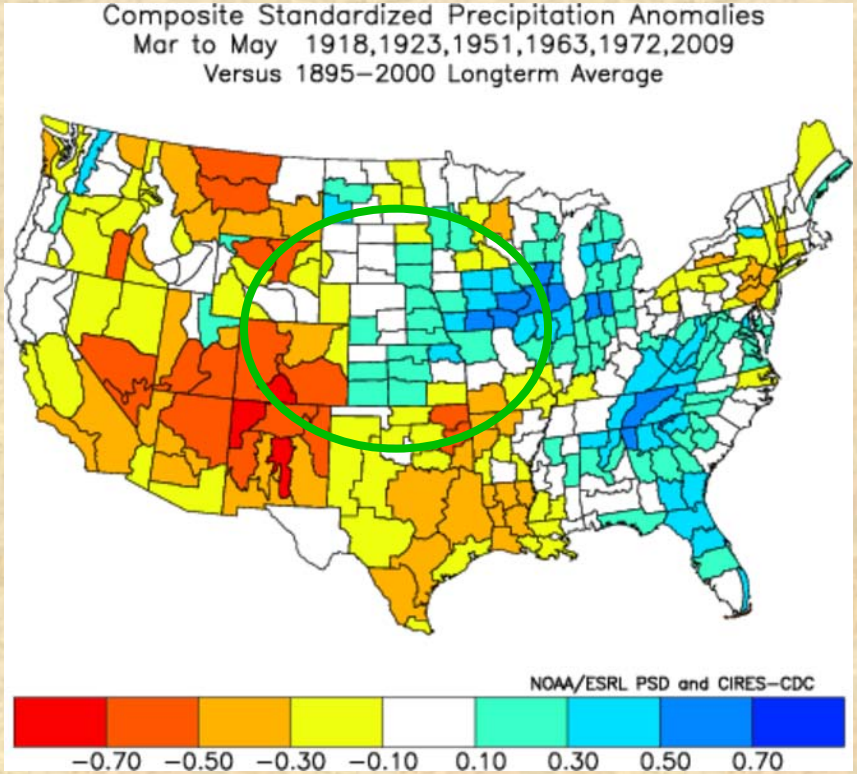


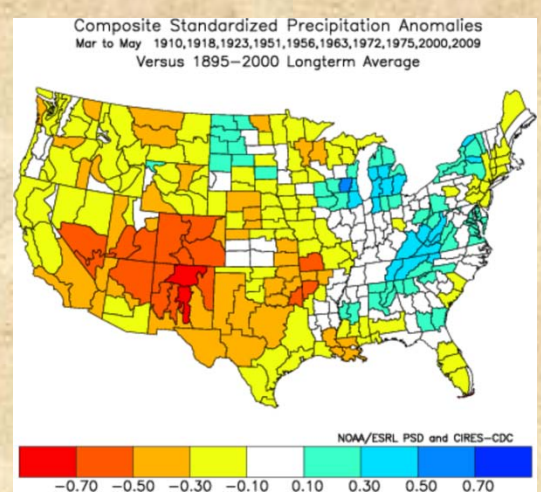
Top left is 2nd Water Year composite for 4 La Niña events that lasted LONGER than two years, top right is same for 6 events that ended before Year 3 began; bottom left shows the average of all 10.

Incidentally, every one of the six non-La Niña events in Year 3 actually turned into an El Niño!

2nd spring La Niña composites

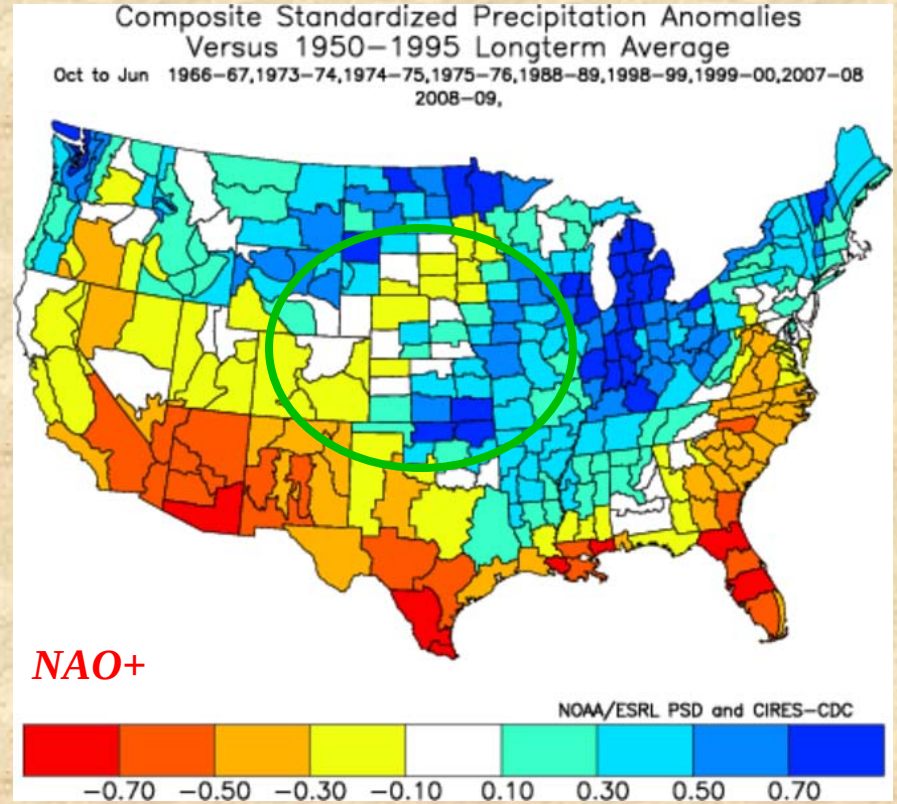


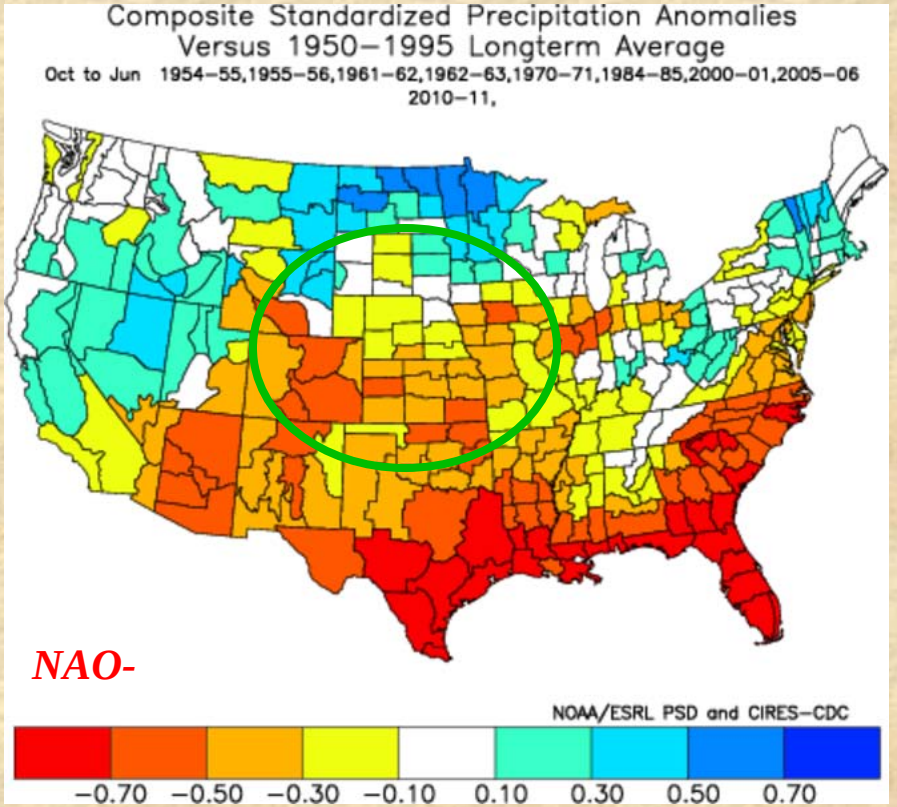




Top left is 2nd Water Year composite for 4 La Niña events that lasted LONGER than two years, top right is same for 6 events that ended before Year 3 began – *big difference for NE!!*

(N)AO & La Niña

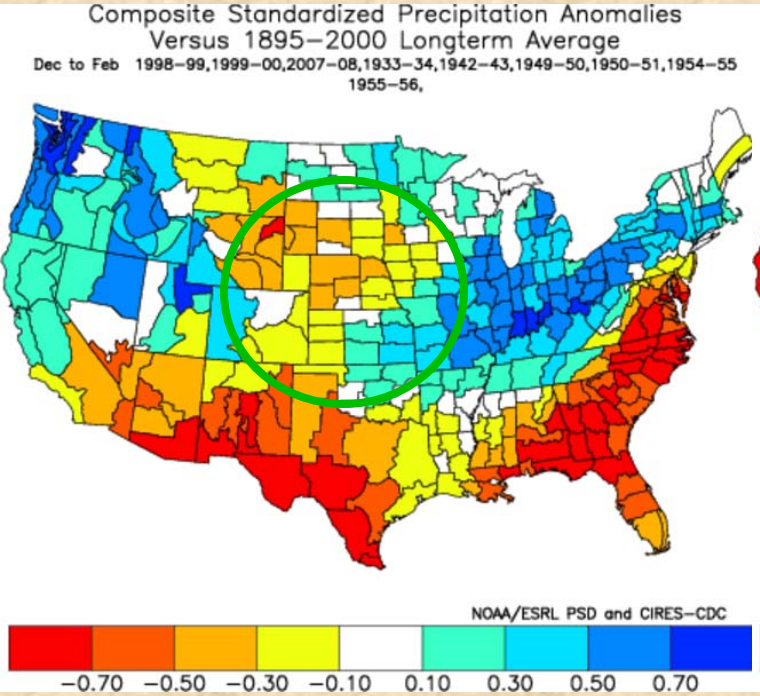


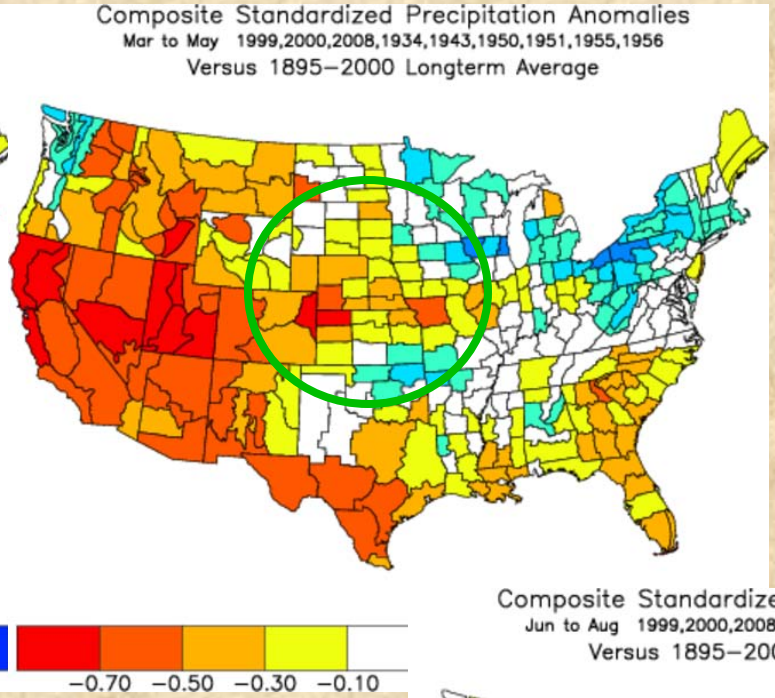


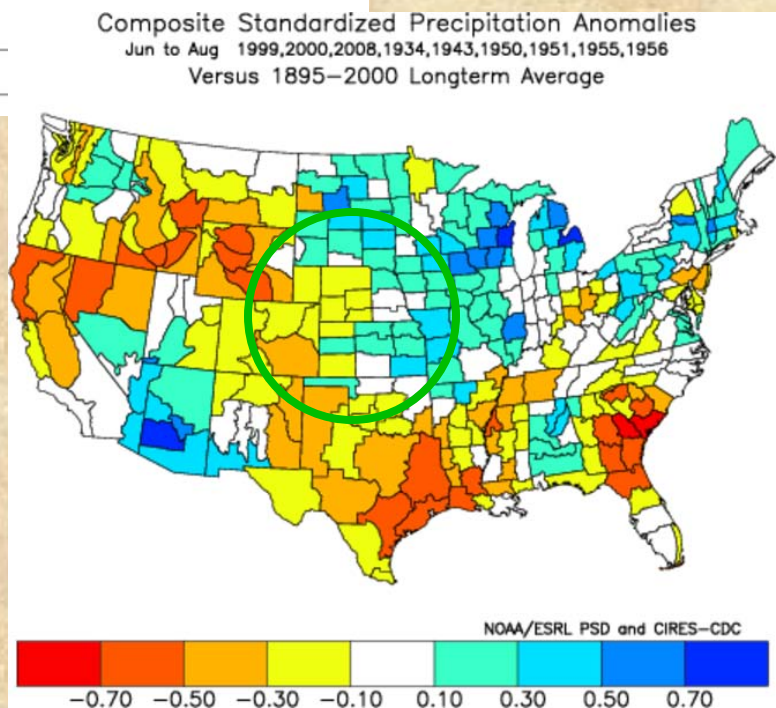
While another negative NAO winter would not help with the current drought, the evidence so far is conflicting – summer NAO was extremely negative (which tends to re-emerge in winter), but May SST was more consistent with return to positive NAO this winter;

sunspot link has been claimed recently, but the current sunspot cycle is actually approaching a feeble peak so it would not support another negative NAO winter…

La Niña precipitation with positive AMO phase







Composite precipitation anomalies in eight moderate+ La Niña cases with a warm North Atlantic. In the southeastern U.S., winters, springs, and summers tend to be drier than just with La Niña alone.

This occurred despite an overall weak AMO signal in this region.

Consistent with modeling work by Schubert et al. (2009).

La Niña Forecast Review

- Strong La Niña in place during last the last winter.

- Persistence and ENSO models correctly forecasted moderate to strong La Niña through Spring (MAM) of 2011.

- Models have little skill predicting past the “spring barrier”.

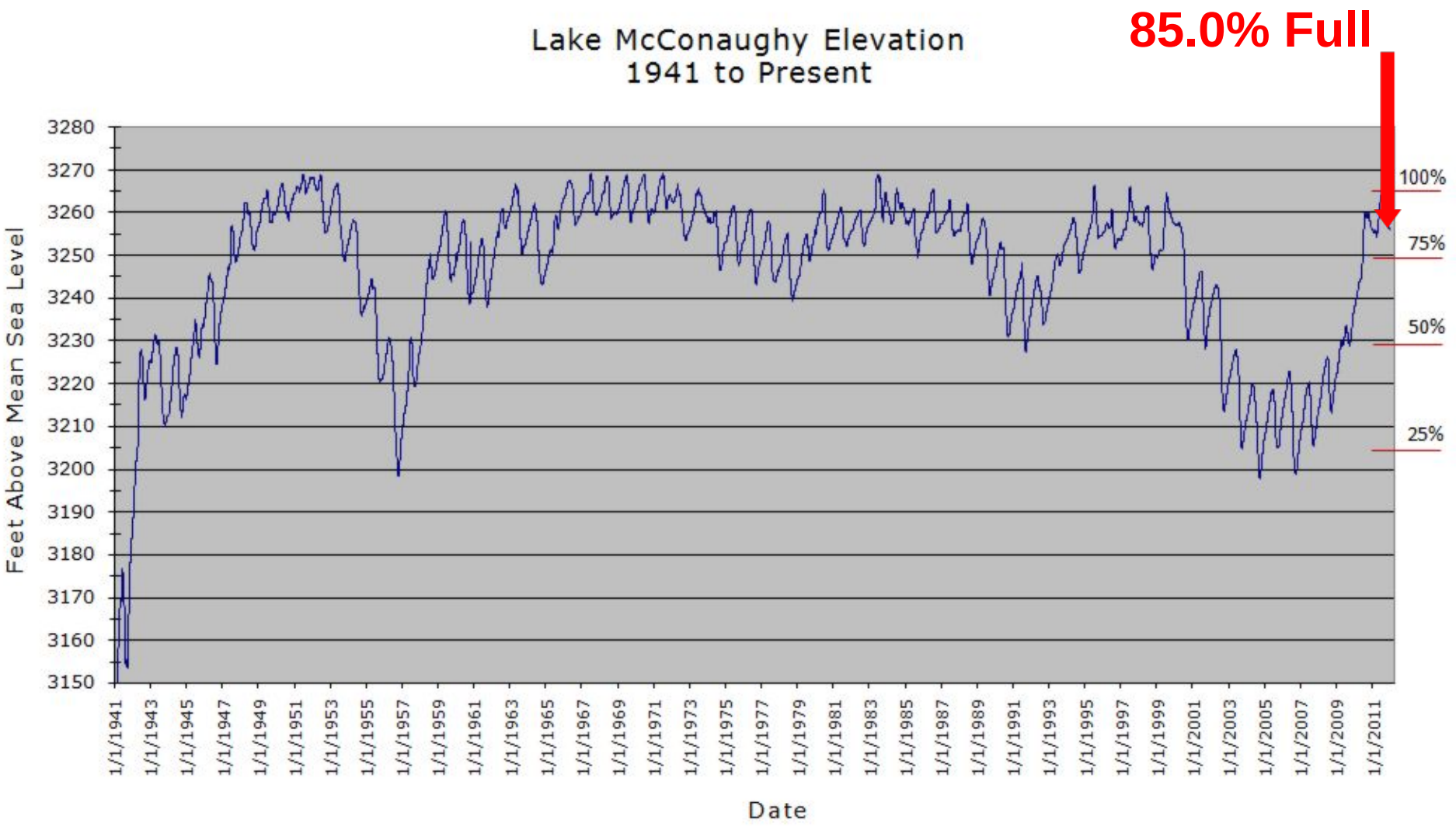
- Correlation of strength versus duration and analog predictions indicated good chance of lasting past summer of 2011 (Klaus Wolter).

- SST’s and MEI returned to neutral during summer of 2011, only for La Niña to re-emerge in the Fall of 2011.

Nebraska Water Supply Update…

University of Nebraska Lincoln

National Drought Mitigation Center



SOURCE: CNPPID www.cnppid.com

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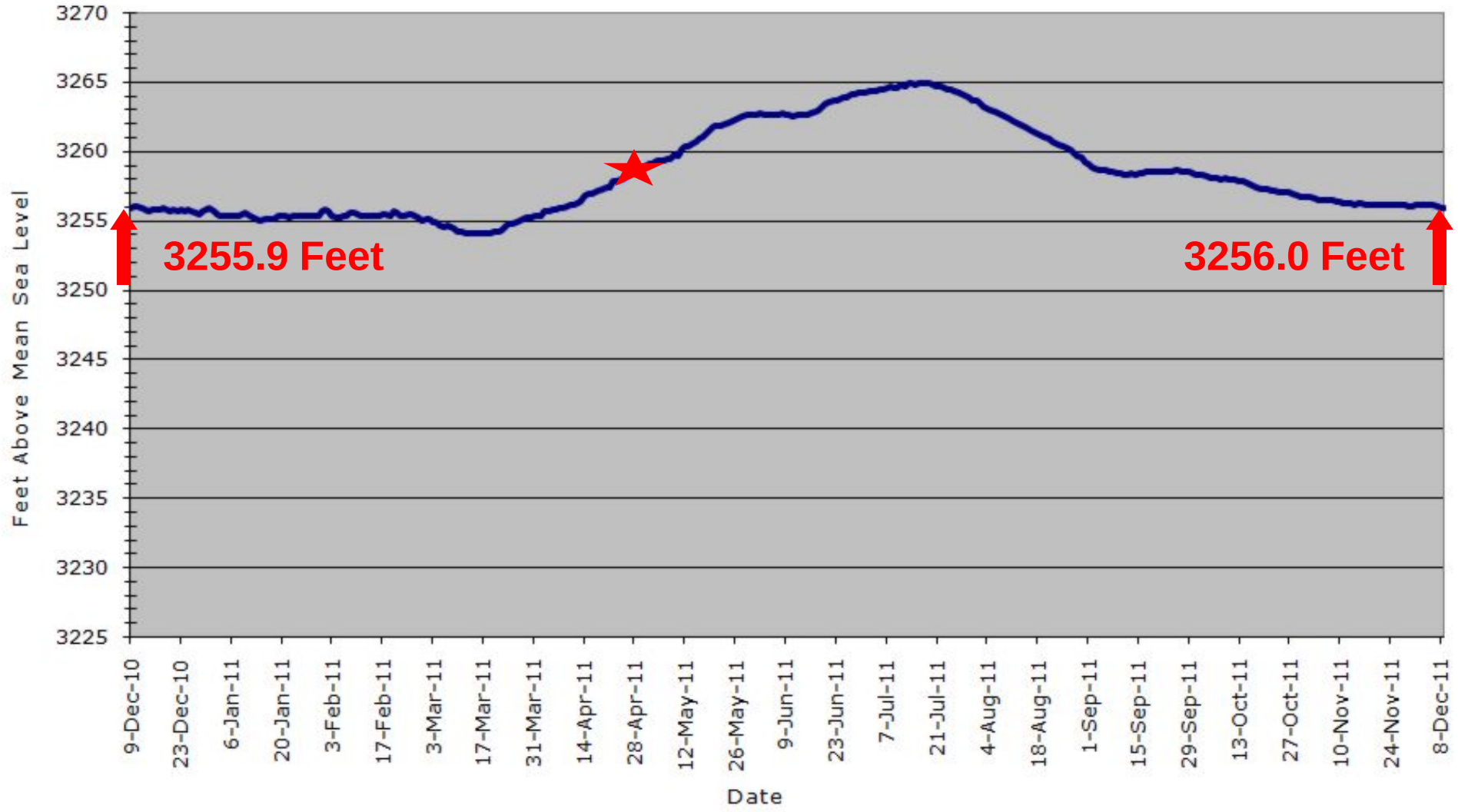
National Drought Mitigation Center

Lake McConaughy Elevation

Dec. 9, 2010 to Dec. 9, 2011

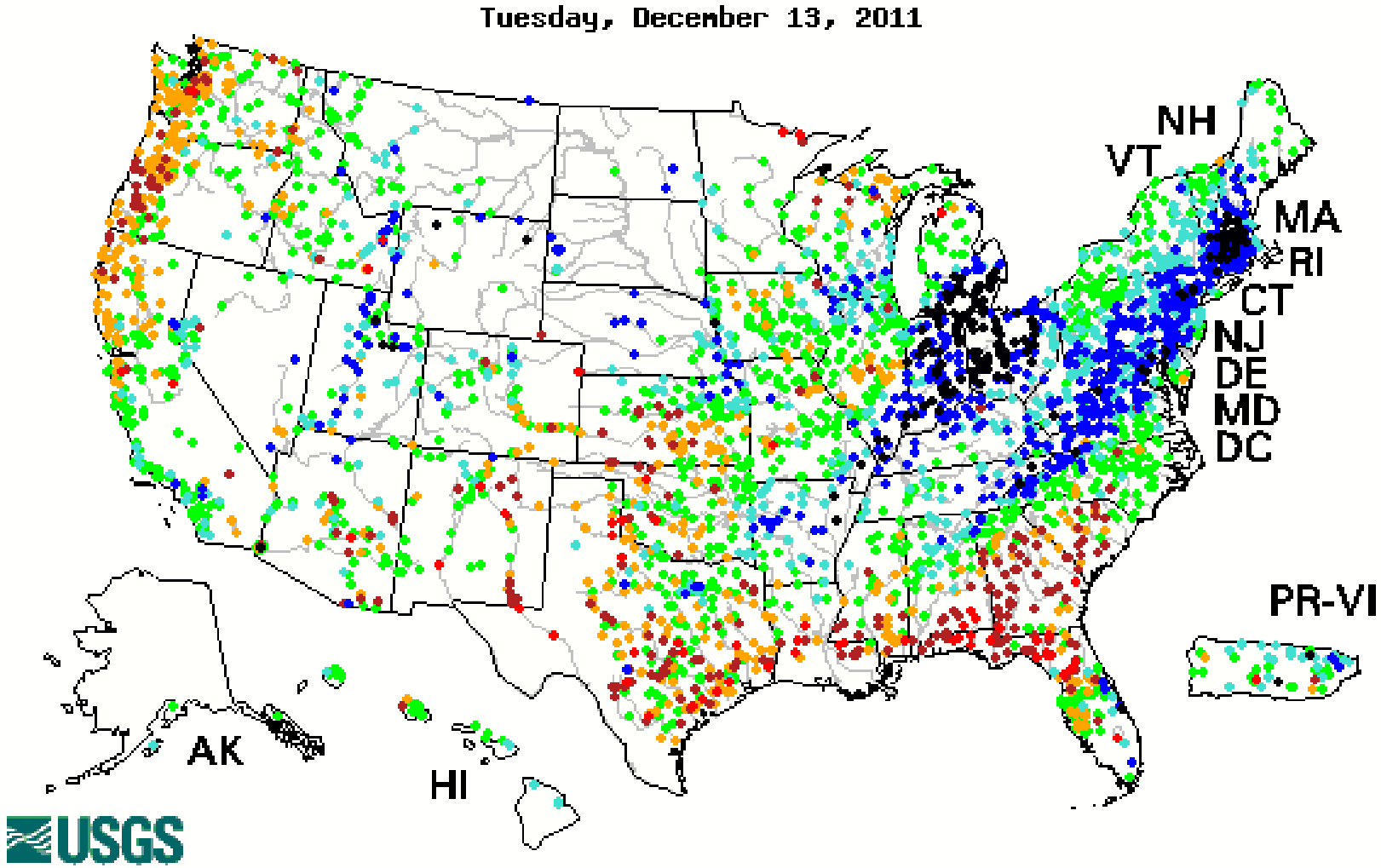


University of Nebraska Lincoln

SOURCE: CNPPID www.cnppid.com

National Drought Mitigation Center

Map of 14-day average streamflow compared To historical streamflow for the day of year



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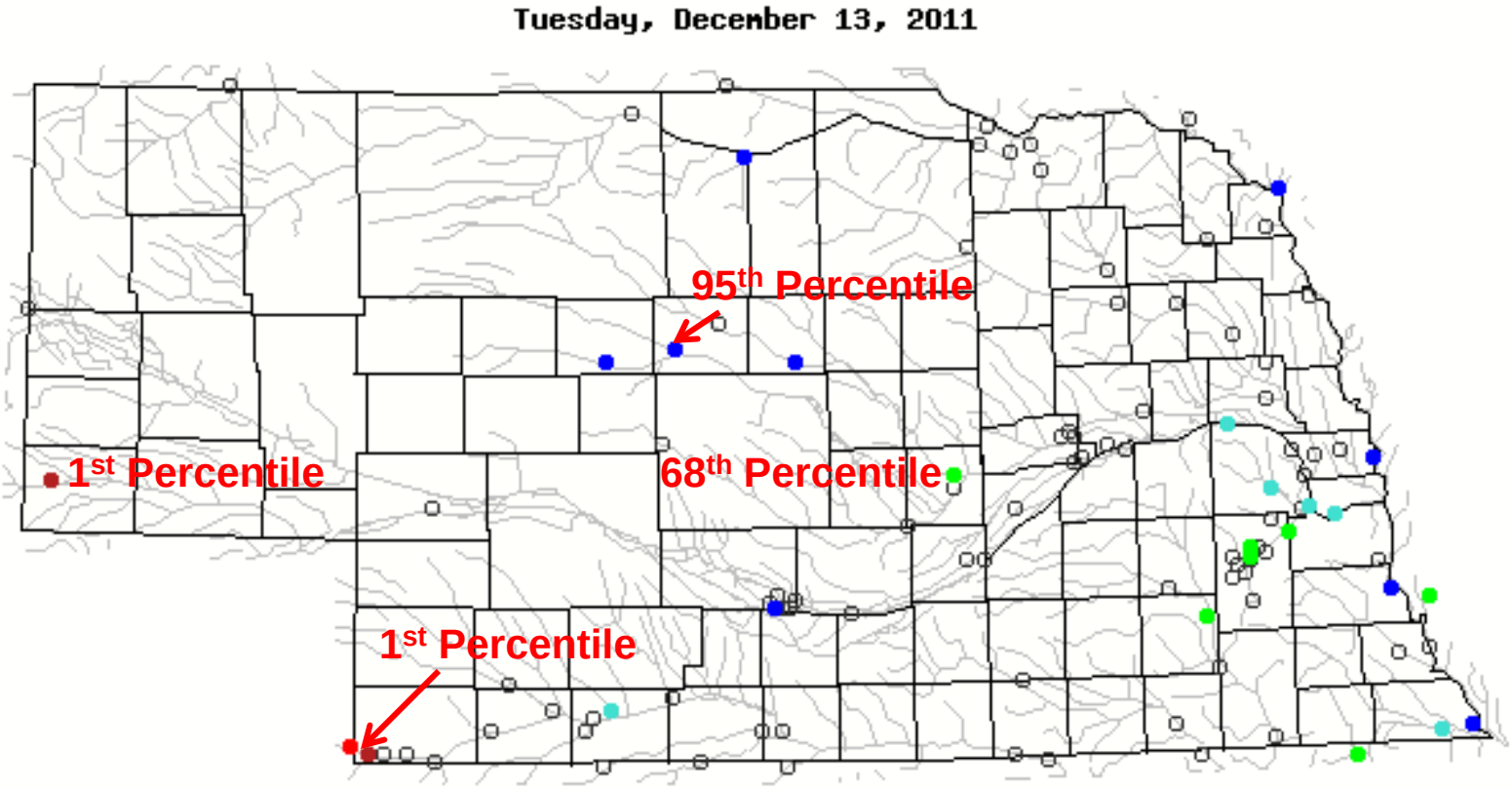

USGS

Explanation - Percentile classes							
Low	<10 Much below normal	10-24 Below normal	25-75 Normal	76-90 Above normal	>90 Much above normal	High	Not-ranked

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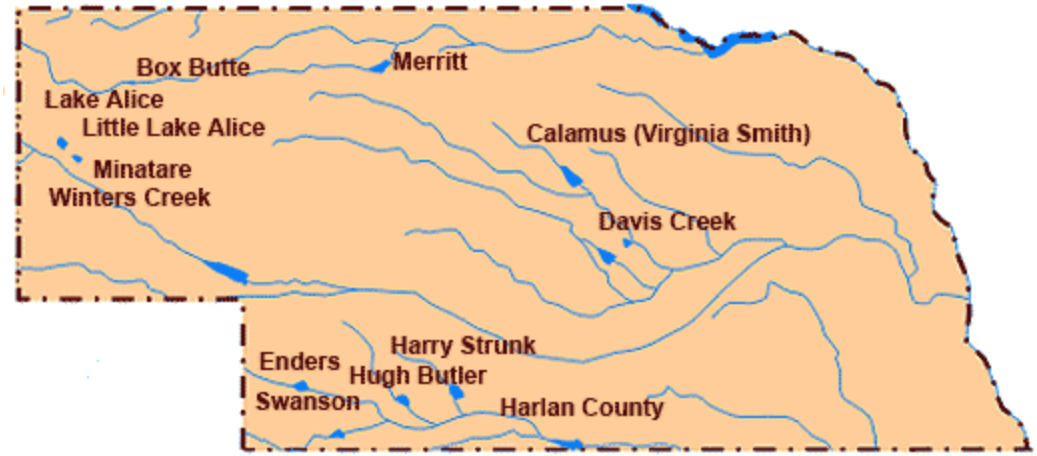
National Drought Mitigation Center

Republican River Basin

- **Hugh Butler:** 16.8% of conservation pool
- **Enders:** 40.4% of conservation pool
- **Harry Strunk:** 87.7% of conservation pool
- **Swanson:** 54.0% of conservation pool



Source: BOR http://www.usbr.gov/gp/lakes_reservoirs/

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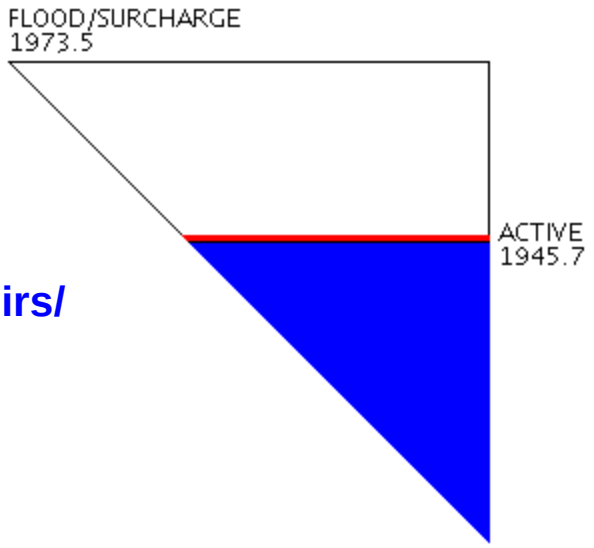
Republican River Basin

Harlan County Current Conditions

- ✓ Conservation Pool is 100% Full
- ✓ 322,015 Acre-Feet of water in storage compared to 311,994 AF last year at this time



Source: BOR http://www.usbr.gov/gp/lakes_reservoirs/

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Real-Time Groundwater Level Monitoring Network

RMA

Navigation

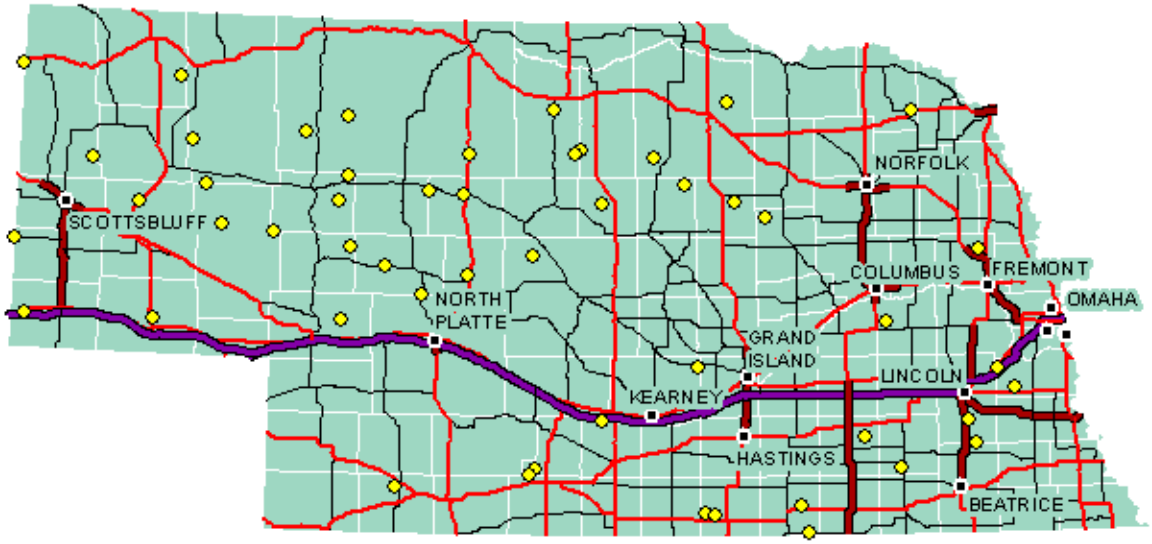
About our Project
Introduction, Project Personnel

About Groundwater
World water distribution, Groundwater system

Explore Network
2-D map of the real-time monitoring network, Retrieve groundwater level data

Documentation
GOES Related Document, Project Presentation, Equipment Specification and Installation Guide

2-D Map of the Monitoring Network Stations



http://snr-1349.unl.edu/FinalMap/navigationMap.aspx

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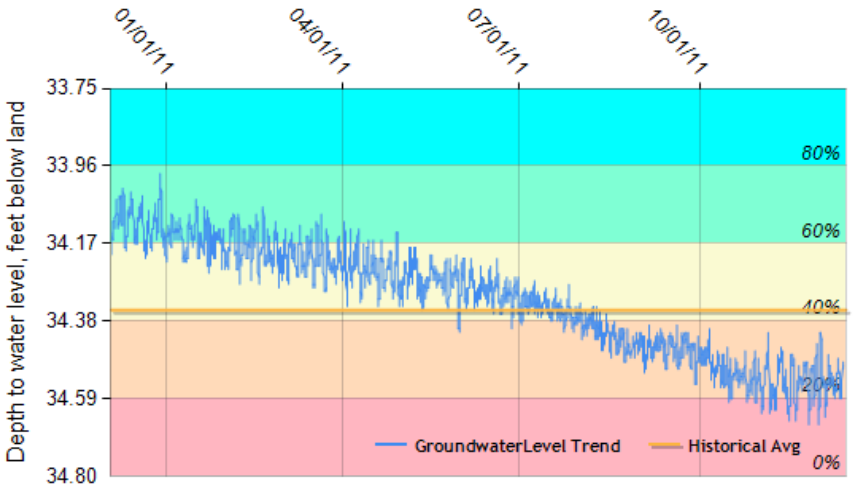
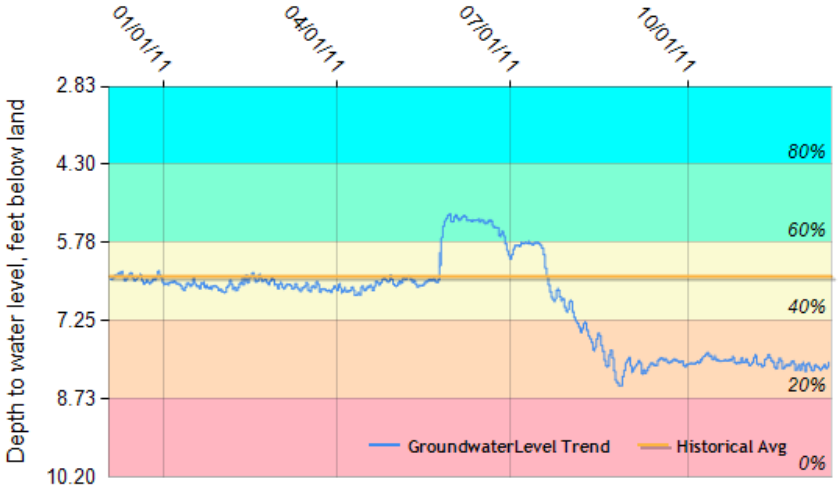
Trenton, NE



Buffalo County, NE



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Summary

- Relatively dry heading into Winter/Spring 2012.
  - 16% of NE in D1-D2 (no D3 or D4)
  - Climatologically dry time of year
  - Critical recharge period though
  - La Nina is in place again this winter….should signal persistence of NE drought into next spring
- Rockies snow pack off to a sluggish start compared to last year, but still ***REAL*** early! Plenty of time to change this story's ending!
- In general, streamflow and lake levels are in good shape (Big Mac (85% full) very similar to this time last year and Harlan County is at 100%)
- Dryness and severe drought is still on our door step on many fronts

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Questions?

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